

Level 1B Radiance Validation

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Aspects of the Level 1 validation

- Preflight and laboratory calibration work
 - Cross-cal radiometers
 - Consistent calibration between field radiometers and satellite sensors
 - Consistent lab calibration relative to solar irradiance
- Ground-look methods with ground-based data
 - Reflectance-based approach
 - Irradiance-based approach
 - Cross-calibration
- Ground-look methods with aircraft overflights
- Cross-calibration with no ground-based data

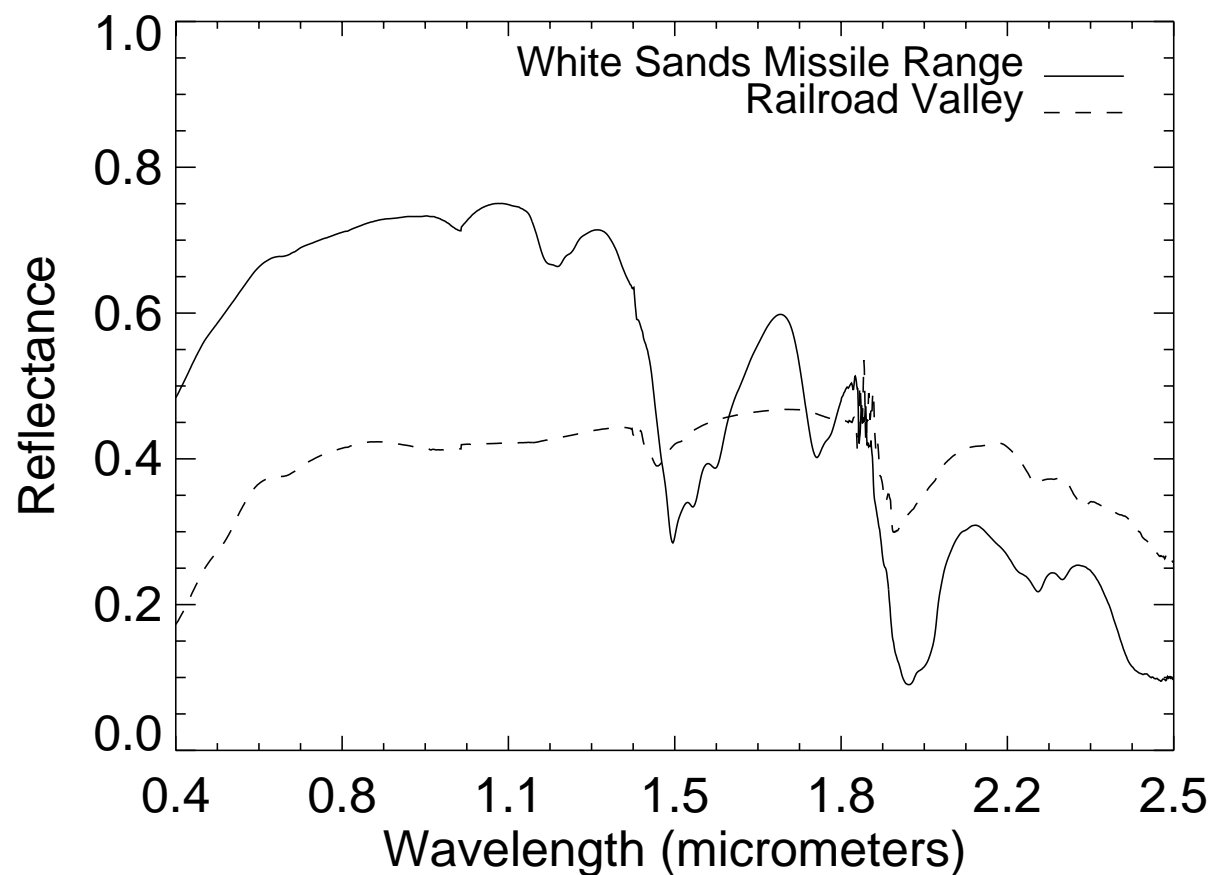
Test sites

- White Sands Missile Range, New Mexico
 - Alkali flats area (not the dunes)
 - 1.2 km elevation
 - Arid region of the United States
 - Overall size is approximately 40 km in extent

- Railroad Valley Playa, Nevada
 - Dry lake bed in central Nevada between Ely and Tonopah
 - 1.4 km in elevation
 - Arid region of the United States
 - Overall size is approximately 15 km in extent

- Other test sites include
 - Lunar Lake Playa, Nevada that is near Railroad Valley at 1.6-km elevation with a size of approximately 2 by 3 km
 - Ivanpah Playa, Nevada near Las Vegas at 0.8-km elevation with a size of approximately 3 by 5 km
 - Lake Tahoe on the California-Nevada border

Test sites - spectral reflectance



Field Calibration Plan

Days	Activity
1	Terra launch
53	End of ASTER sensor checkout
57-89	Extended campaign
95-105	Short-turnaround campaign
105-137	Cross-calibration w/o ground data
137-144	Short-turnaround campaign
144-201	Cross-calibration w/o ground data
201-208	Short-turnaround campaign
208-265	Cross-calibration w/o ground data
265-272	Short-turnaround campaign
272-313	Cross-calibration w/o ground data
313-345	Extended campaign

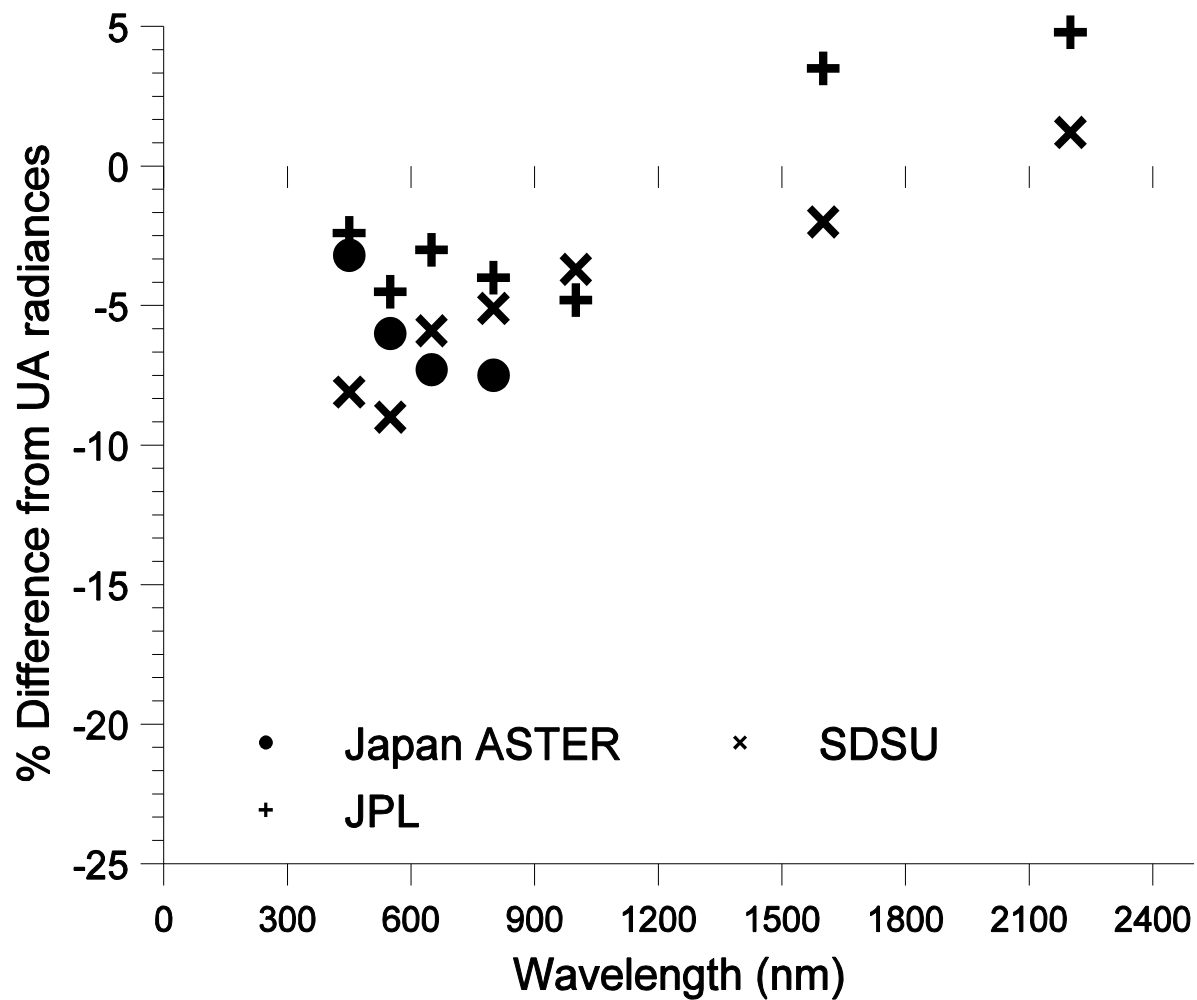
Field Calibration Plan

Days	Activity
345-441	Cross-calibration w/o ground data
441-448	Short-turnaround campaign
448-547	Cross-calibration w/o ground data
547-554	Short-turnaround campaign
602-681	Cross-calibration w/o ground data
681-713	Extended campaign

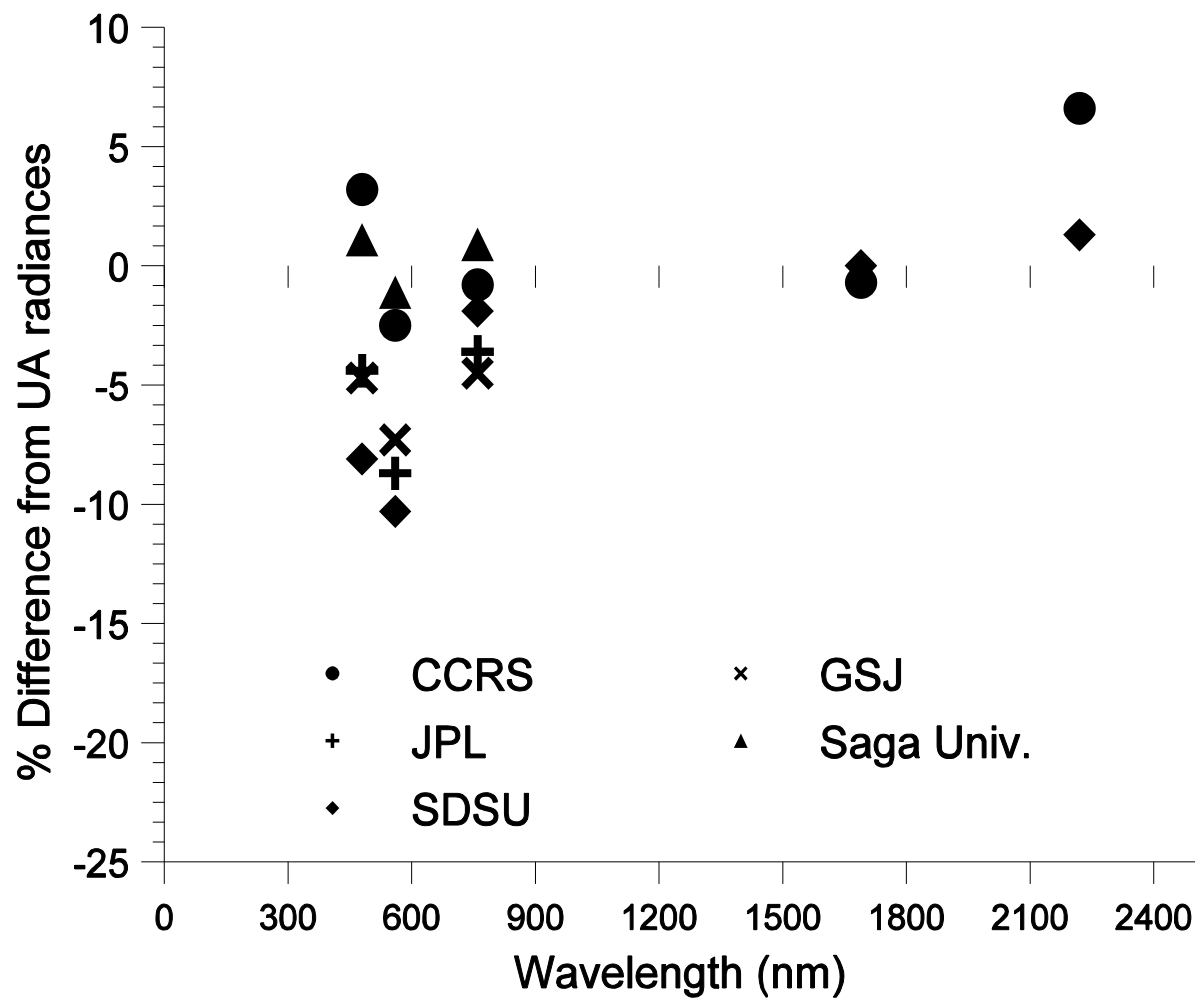
Field Calibration Plan

Day	Location	Sensor View Angle	Aircraft
1 (Sept. 22)	Ivanpah Playa	nadir	
4 (Sept. 25)	Lunar Lake and Railroad Valley	off-nadir	
6 (Sept. 27)		off-nadir	
8 (Sept. 29)		nadir	yes
11 (Oct. 2)	Lake Tahoe	off-nadir	yes
13 (Oct. 4)		nadir	yes
15 (Oct. 6)		off-nadir	yes
20 (Oct. 11)		off-nadir	yes
22 (Oct. 13)	Lunar Lake and Railroad Valley	off-nadir	yes
24 (Oct. 15)		nadir	yes
26 (Oct. 17)		off-nadir	
31 (Oct. 22)	Ivanpah Playa	off-nadir	
33 (Oct. 24)		nadir	

Joint Campaign Results - 1996



Joint Campaign Results - 1997



Closing comments

- Work for the past three years gives confidence that the radiance validation (or vicarious calibration) can be provided at better than 5% uncertainty for small footprint systems and approaches 3% in the VNIR
- Work still remains to show that this uncertainty can be obtained for MODIS-sized pixels
- Work also remains to show that the above uncertainties apply to off-nadir cross-calibrations
- Biggest problem right now is lack of data points (temporal frequency)
- This is being investigated currently and we are confident that this can be solved through a combination of field campaigns and cross-calibration data